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Abstracts

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Comparison of Methods for Amylose Screening Among Amylose-Extender (*ae*) Maize Starches from Exotic Backgrounds.

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Breeding for high-amylose corn requires a rapid analytical method for determining starch amylose so that generating wet chemistry values does not pose a major limitation in the volume of materials that can be screened. Two methods for determining apparent amylose content (AAC) were examined and compared with an iodine-binding method involving the solubilization of isolated starch in a sodium hydroxide solution (method 1). These methods included one based on near-infrared transmittance spectroscopy (NIRT) (method 2) and another iodine-binding method involving the solubilizing of starch from ground whole corn with a DMSO-iodine solution (method 3). These methods were chosen because, aside from initial set up costs, they are relatively rapid and inexpensive to perform. The materials evaluated consisted of various exotic corn populations including plant introductions and experimental materials generated from the Germplasm Enhancement of Maize (GEM) project. Crosses were made between these materials and a Corn Belt dent hybrid (OH43 × H99) converted with the amylose-extender (*ae*) allele. Grain from F2 ears, presumed to be homozygous for the *ae* allele based on visual selection of mutant kernels on F1 ears from which they were planted, were then evaluated to identify possible modifiers of *ae* conditioning high starch AAC. From a total of 1,006 F2 ears, a core set consisting of 155 samples was established and only these were subjected to starch AAC analysis, using all three methods to compare the methods. Method 2 showed poor correlation to method 1 ($r = 0.88$), however, NIRT did appear to discriminate between samples converted to *ae* vs. those with a normal or possibly segregating endosperm type. Method 3 showed a slightly better correlation with method 1 ($r = 0.92$) and appeared to more fully discriminate among samples with AAC values >65% from those at approximately 55%. Results from this study suggest that NIRT may be useful when a quick screening method is needed to discriminate mutant from nonmutant genotypes within grain samples of exotic germplasm especially when visual identification is difficult. In addition, method 3 could be used to replace the more time-consuming method 1 when trying to identify high AAC levels among *ae* genotypes, even though some inconsistency was observed between the two methods. Finally, this study revealed that exotic germplasm may be an important source of new modifiers to the *ae* allele because values as high as 70% AAC were identified.

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I hereby certify that the foregoing RESPONSE AFTER FINAL OFFICE ACTION(three pages of claims 1-31, one of specification and the response (4 pages) and the 4 pages of articles on "ae" of 12/19/03 for application 09/811,048 is faxed to 703-872-9306 at Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on this 5th day of March 2004.

